

PATENT SPECIFICATION

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COMPLETE SPECIFICATION.



Improvements in or relating to Devices for use in Starting Internal Combustion Engines.

I, FRIEDRICH WINTERHOFF, of 113, Barthelstrasse, Cologne-Ehrenfeld, Germany, a citizen of the German Republic, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention has reference to devices which are serviceable in starting internal combustion engines for heating the combustible mixture prior to its admission to the engine cylinder, and are of the kind comprising a coil of electric resistance wire mounted on a supporting member of insulating material and supported from a ring of insulation material, adapted to be disposed between the flanges of parts of the intake conduit of the engine cylinder. In connection with devices for heating the combustible mixture prior to its admission to the engine cylinder, it has been proposed to support an electric heating element by screws within a chamber disposed between the flanges of the carburettor and the induction pipe. The primary object of the present invention is to provide improvements in devices of the above kind whereby the electrical heating element is capable of being adjustably mounted and efficiently supported in the said conduit free of the sides thereof and are adapted for sufficiently preheating the combustible mixture to enable the engine in a cold condition to be rendered fully operative when starting the same.

According to the invention the electric heating element is supported in position within the said conduit by screws or their equivalents which engage with the said element and the ring of insulating material. The element thus supported renders possible an immediate heating of the fresh combustible mixture, whereby the engine even in the severest cold conditions, can be started within a few minutes, the device comprising the electric heating element being arranged in the adjacent parts of the carburettor and the inlet fitting of the cylinder in such a way that the mixture produced by the suction stroke of the engine is warmed by the electric heating element and rendered

sufficiently combustible or explosive to enable the engine to be started immediately. In an automobile the electric heating current can, for example, be taken from the secondary battery, and be controlled by an electric switch near the seat of the driver, without exposing the battery to any damage. An electric heating element with a current consumption of from six to ten amperes is sufficient. The electric heating element may be in the form of a coil or a tube and the manner of its attachment is as hereinbefore described. Where the heating element is in the form of a tube this may be similar to devices which are known as immersion heaters. A spirally bent platinum wire would fulfil the purpose but the cost of same would be against its use.

In order that the said invention may be clearly understood and readily carried into effect, the same will now be more fully described with reference to the accompanying drawings, in which:—

Figure 1 is a plan view of the electric heating element suitably mounted in an insulating ring, the latter serving as a holder for the heating element and being adapted to take the place of the packing ring used in some instances between the carburettor and the inlet fitting on the cylinder.

Figure 2 illustrates in section the insulating ring fitted between the said inlet fitting and one end of the carburettor.

The electric insulating ring *a* is fitted with terminal screws *b*¹ and *b*² for the connection of an electric source of energy, and with screws *c* for adjustably supporting the heating element in position, the terminal screws *b*¹ and *b*² being respectively connected to the opposite ends of the electric resistances wire *d* by leads as shewn in Figure 1. The resistance wire is coiled on a tube *e* of asbestos or other insulating material and the ends of the coil are clamped thereto by rings *e*¹. The insulating ring *a* is adapted to serve as a packing ring and is disposed between the carburettor *f* and the inlet fitting *g* of the cylinder and is secured in position by bolts passed through bolt holes in the ring *a* and flanges on the carburettor *f*

- and the fitting *g*. The heating element is supported by the screws *c* within the plate *a* and the parts of the carburettor *f* and fitting *g* adjoining the same, the screws being attached to the tube *e* and to the insulation ring *a*. The connections from the terminals *b*¹ and *b*² to the coil of resistance wire pass through the electric insulating ring *a*.
- 10 Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—
- 15 1. A device of the kind referred to, wherein the electric heating element is supported in position by screws or their equivalents which engage with the said

element and the ring of insulating material, for the purpose specified.

2. The arrangement of a device as in Claim 1, between the carburettor and the cylinder inlet fitting of an integral combustion engine, for the purpose specified.

3. A device for use in starting internal combustion engines constructed and arranged substantially as hereinbefore described with reference to the accompanying drawings.

Dated this 9th day of November, 1927.

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[This Drawing is a full-size reproduction of the Original.]

